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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,994	10/05/2001	Joong- Hyun Mun	06192.0204.NPUS00	3599
22930	7590	05/07/2004	EXAMINER	
HOWREY SIMON ARNOLD & WHITE LLP BOX 34 1299 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004			DI GRAZIO, JEANNE A	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 05/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/970,994	Applicant(s) MUN ET AL.	
	Examiner Jeanne A. Di Grazio	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7 and 8 is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☒ Claim(s) 2-6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims

Claims 2-8 have been allowed (Office Action of 20 November 2003). Specifically, claims 2-6 had been objected to as being dependent upon a rejected base claim (claim 1). Claims 1, 7, and 8 are independent claims. Claims 9-16 are new. Claim 1 is currently pending.

Election/Restrictions

Newly submitted claims 9-16 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: (1) Applicant's new claims (of which 9, 12, and 15 are independent claims) recite the limitation of "a common electrode formed on the second substrate and having a first protrusion pattern and a second protrusion pattern" and as such are a separate species from Applicant's originally presented claims drawn to "a common electrode formed on the second substrate and having a second aperture pattern." (2) Applicant's Amendment of 11 February 2004, acknowledges that the new claims "claim the invention from different perspectives." (Amendment of 11 February 2004 at Page 13)(emphasis added).

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 9-16 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

I. Original Rejection

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (US 6,573,965 B1) in view of Melnik et al. (US 6,473,149 B2).

Per claim 1: Liu has a substrate on which pixel electrodes are formed and the pixel electrodes have apertures (See Figure 3). Liu also has a second substrate on which common electrodes are formed and the common electrodes have apertures (See Figure 4). Liquid crystal is between the substrates (referring to # 314 of either Figures 3 or 4). Liu has bump-like structures acting as spacers on the substrates (for example, #s 309-312)(see also col. 5, lines 26-35). In Figures 3-5 of Liu, the center portions of the first and second aperture patterns are straight (if one

Art Unit: 2871

draws an imaginary line down the center of the aperture one arrives at a straight line) and the apertures are formed alternately in parallel (this is clearly illustrated in Figure 5, for example).

Liu does not appear to explicitly disclose spacers positioned at ends of the second aperture pattern.

Melnik teaches the elimination of reverse-tilt in high density reflective liquid crystal displays (Title, entire patent). Melnik teaches spacers of a low dielectric constant relative to the liquid crystal located in the inter-pixel region to eliminate bend deformation and reverse tilt disclination [ABS, title, entire patent]. The spacers (110') (with reference to Figure 5 and Column 4, by way of non-limiting examples) are located in the inter-pixel region (Column 4, Lines 55-65 for example).

Melnik is evidence that those of ordinary skill in the art of liquid crystals would have found the reason, suggestion, and motivation to use spacers in the disclination regions optimized to locations at ends of spacer aperture patterns to prevent reverse tilt disclination (Id.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the display of Liu with the spacers in the disclination regions optimized to locations at ends of spacer aperture patterns of Melnik to prevent reverse tilt disclination.

II. New Rejection

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (US 6,573,965 B1) in view of Takeda et al. (US 2004/0046915 A1)(division of application No. 09/662,236 filed on September 14, 2000).

Art Unit: 2871

Per claim 1 (amended): Liu has a substrate on which pixel electrodes are formed and the pixel electrodes have apertures (See Figure 3). Liu also has a second substrate on which common electrodes are formed and the common electrodes have apertures (See Figure 4). Liu has bump-like structures acting as spacers on the substrates (for example, #s 309-312)(see also col. 5, lines 26-35). In Figures 3-5 of Liu, the center portions of the first and second aperture patterns are straight (if one draws an imaginary line down the center of the aperture one arrives at a straight line) and the apertures are formed alternately in parallel (this is clearly illustrated in Figure 5, for example).

Liu does not appear to explicitly disclose spacers positioned at ends of the second aperture pattern.

Takeda teaches and discloses a liquid crystal display device and thin film transistor substrate (Title, entire patent). The liquid crystal display device is multi-domain and comprises electrode patterns having slits (entire patent) and liquid crystal disposed (as opposed to injected) between substrates (Figure 8, PRIOR ART). It is respectfully pointed out that “disposed” is not synonymous with “injected.” Dispose means “to give a tendency to: INCLINE or to place, distribute, or arrange esp. in an orderly way.” (Merriam Webster’s Collegiate Dictionary, 10TH Ed. at Page 335). Inject means “to introduce into something forcefully.” (Merriam Webster’s Collegiate Dictionary, 10TH Ed. at Page 600). The fact that liquid crystal is now claimed as disposed as opposed to being injected results in a different claim and may have different implications based on the nature of a multi-domain display. Takeda teaches the essential relationship between spacers (dielectric materials) and location of the dielectric materials with respect to the location of the electrode slits [0390](by way of non-limiting example). The

Art Unit: 2871

position of the dielectric material with respect to the electrode apertures is crucial to prevent disclination and to ensure proper liquid crystal alignment (entire patent).

Takeda is evidence that ordinary workers in the field of liquid crystals would have had the reason, suggestion, and motivation to locate spacers at ends of electrode aperture patterns to prevent disclination and so that proper liquid crystal alignment could thus be realized.

Therefore, it would have been obvious to one of ordinary skill in the art of liquid crystals at the time the invention was made, based on the teachings of Liu and Takeda to modify Liu in view of Takeda to prevent disclination and so that proper liquid crystal alignment could thus be realized.

Response to Arguments

Applicant's arguments filed on February 11, 2004 have been fully considered but they are not persuasive.

Applicant's ONLY Arguments:

(1) Applicant states that "[f]irst, it is submitted that the Examiner's reasoning for rejection is based on inaccurate understanding of Melnik. Melnick is directed to prevent reverse tilt disclination in *the pixel region*, not in the interpixel region." (Amendment at Page 10)(emphasis in original).

(2) Applicant states that "[s]econd, Melnik does not disclose or even remotely suggest why spacers should be positioned at the end of the aperture pattern." (Amendment at Page 11).

(3) Applicant states that "[t]hird, the Examiner asserted "optimization of a results effective variable requires only routine skill in the art and Melnik is evidence that those of ordinary skilled ... would have found the reason, suggestion, and motivation to use spacers in the

Art Unit: 2871

disclination regions optimized to locations at ends of spacer aperture patterns to prevent reverse tilt disclination.” (Amendment at Page 12).

Examiner’s Response to Applicant’s ONLY Arguments:

(1) Contrary to Applicant’s assertions with respect to argument (1), Melnik **IS** directed to to prevent reverse tilt disclination in the interpixel region (Abstract, see also, Column 4, Lines 41-65).

(2) Melnik explicitly teaches and suggests that “even if the spacer 110’ does not completely displace the liquid crystal in the interpixel region ... and/or the spacer material does not span the entire width between electrodes 112a, 112b, **formation of a reverse tilt disclination in the region above electrode 112b can be prevented** (Column 4, Lines 55-65). Further, “ ... particularly for cases when the spacer material does not fill (completely fill, as in a rib) the interpixel region ... can further serve to impede the formation of reverse tilt disclination.” (Id.).

(3) Melnik thus teaches and suggests that spacer location with respect to electrodes having apertures is crucial to preventing reverse tilt disclination.

Allowable Subject Matter

Claims 7 and 8 are allowed (per Office Action of November 20, 2003).

Claims 2-6 are objected to as being dependent upon a rejected base claim (per Office Action of November 20, 2003), but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (571)272-2289. The examiner can normally be reached on M-F.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeanne Andrea Di Grazio

Patent Examiner
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